

**NHDOT SPR2 PROGRAM**  
**RESEARCH PROGRESS REPORT**

<b>Project #</b> SPR 26962Y		<b>Report Period</b> Year 2021 <input type="checkbox"/> Q1 (Jan-Mar) <input checked="" type="checkbox"/> Q2 (Apr-Jun) <input type="checkbox"/> Q3 (Jul-Sep) <input type="checkbox"/> Q4 (Oct-Dec)
<b>Project Title:</b> Assessment of Embedded Culvert Low Flow Hydraulics		
<b>Project Investigator:</b> Tom Ballestero <b>Phone:</b> 603.862.1405		<b>E-mail:</b> <a href="mailto:tom.ballestero@unh.edu">tom.ballestero@unh.edu</a>
<b>Project Start Date:</b> May 1, 2019	<b>Project End Date:</b> September 30, 2021	<b>Project schedule status:</b> <input checked="" type="checkbox"/> On schedule <input type="checkbox"/> Ahead of schedule <input type="checkbox"/> Behind schedule

**Brief Project Description:**

The proposed research has two fundamental thrusts: to field study constructed embedded culverts in NH and a thorough literature review of embedded culverts. The fundamental objective to determine if at low flows, water disappears into the embedment material thereby representing a barrier to aquatic organism passage (AOP). A secondary objective is the sediment retention in the structures and whether in general they provide AOP. The project includes periodic Technical Advisory Group meetings. The office portion of the research identifies existing NHDOT and other embedded culverts in NH. Lines of communication (phone, e-mail) are to be opened with regulating entities in other states (in neighboring states and Pacific northwest and Alaska) to solicit their experiences with embedded culverts. This will include gathering design specifications from those jurisdictions. The research team will also collect and sift through the technical guidance documents for other states, FHWA, and countries and compare to NH guidance. The construction community will be interviewed to determine if there are limitations in the supply or placement of the embedment material available in New Hampshire. NH DOT provided a list of its embedded culverts. NH DOT personnel were interviewed to determine where they have installed embedded culverts and to collect their design plans. The embedded culverts from the DOT and other sources will all be targeted for field visits. Knowledge of the location of each culvert will allow investigation into watershed and hydrologic characteristics at the site of each culvert. These characteristics will be documented via online resources such as StreamStats and GRANIT. The DOT and DES culvert databases will also yield embedded culvert metadata such as: year constructed, embedment particles size distribution, embedment depth, etc.

**Progress this Quarter (include meetings, installations, equipment purchases, significant progress, etc.):**

The past quarter efforts included: determining site sample particle size distributions from collected samples; developing design variables from design plans; synthesizing data; reaching out to other states and their agencies overseeing embedded culverts; and coordinating with NHDES on statistical analyses. Since there is ample budget remaining, the decision from the last TAG meeting was to extend the project duration to September 30, 2021 (no-cost extension), and to do a thorough statistical analysis of the developed database. In this quarter the contract extension paperwork was completed and ultimately approved by G&C.

**Items needed from NHDOT (i.e., Concurrence, Sub-contract, Assignments, Samples, Testing, etc...):**

Information on any new culverts installed since project inception.

**Anticipated research next three (3) months:**

Perform statistical analyses, coordinate statistical analyses with NHDES, plan next TAG meeting, write final report.

**Circumstances affecting project:**

Nothing at this writing.

Budget, scope, and timing are all on schedule.

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<b>Tasks (from Work Plan)</b>	<b>Planned % Complete</b>	<b>Actual % Complete</b>
Task 1 Kickoff meeting	100%	100%
Task 2 Field Efforts	100%	100%
Task 3 Review of other Technical Guidance	85%	85%

**Barriers or constraints to implementing research results**

No barriers presently exist or are anticipated.